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A FURTHER ACCOUNT OF BATOID FISHES FROM
THE WESTERN ATLANTIC

By Henry B. Bigelow and William C. Schroeder

WITH TWO PLATES

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No. 5 — *A Further Account of Batoid Fishes from the Western Atlantic*¹

BY HENRY B. BIGELOW AND WILLIAM C. SCHROEDER

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¹ Contribution No. 1499 from the Woods Hole Oceanographic Institution.

INTRODUCTION

Recent exploratory fishing by the U. S. Fish and Wildlife Service vessels "Oregon" and "Silver Bay" has yielded further collections of batoids trawled, by the former, within the Gulf of Mexico and along the coasts of Central and South America to as far southward as $07^{\circ}15'N$ off the Guianas, and by the latter off the Bahamas and the east coast of Florida. These specimens were trawled within a depth range of 40-750 fathoms, chiefly between 100-500 fathoms.

We thank the various investigators who collected and preserved these specimens and Harvey R. Bullis, Jr., of the U. S. Fish and Wildlife Service for placing them at our disposal. We also thank Peter C. Wilson, Field Party Chief of the Fish and Wildlife Service "Delaware" and Frank J. Mather, III and Martin R. Bartlett of the Woods Hole Oceanographic Institution for furnishing us pertinent data and specimens of the pelagic ray *Dasyatis violacea*, the third and fourth known captures of this species in the western Atlantic.

Most of the material is deposited in the Museum of Comparative Zoology.

Order BATOIDEI

Suborder TORPEDINOIDEA

Family TORPEDINIDAE

TORPEDO NOBILIANA Bonaparte 1835

Our recent account (1962) of this species includes captures from off North Carolina, South Carolina, the Gulf of Mexico, and the offing of Trinidad at $11^{\circ}36'N$, $62^{\circ}52'W$ in depths ranging from 10 to 290 fathoms (18 to 530m). The present collection includes a male 470 mm long from the Caribbean coast of Panama, $9^{\circ}00'N$, $81^{\circ}23'W$, in 250 fathoms (457m), "Oregon" station 3599, its most southerly known range in the western Atlantic. Three more, of 530-700 mm, were taken off the Mississippi Delta in 40-260 fathoms (73-475m), "Oregon" stations 3174, 3688, 3763. As but few very large ones have been both measured and weighed we can report one, a female, caught in a fish trap June 6, 1963, near Woods Hole, Massachusetts, that was $58\frac{1}{2}$ inches (1486 mm) long, $38\frac{1}{2}$ inches (978 mm) wide and weighed 140 pounds (64 kg), for which information we thank Charles L. Wheeler of the U.S. Fish and Wildlife Service.

Suborder RAJOIDEA

Family RAJIDAE

RAJA BAHAMENSIS sp. nov.

Plates 1, 2

Holotype. Mature male, 540 mm in total length, USNM No. 198034, from about 5 miles (8km) off the northwest part of Little Bahama Bank, 27°23'N, 78°26'W, in 212-225 fathoms (382-411 m), "Silver Bay" station 3471.

Study Material. Also three paratypes, a female 490 mm long, MCZ No. 41957 from off the northwest tip of Great Bahama Bank, 26°07'N, 79°12'W, in 200 fathoms (366 m), station 2482, and two males 343 and 530 mm long, respectively, MCZ Nos. 41959 and 41958, from off the western part of Great Bahama Bank in the Straits of Florida, in 200 fathoms (366 m), station 2472.

Comparison with Previously Known Species. The presence of an ocellus on each pectoral fin distinguishes *bahamensis* from other known rajids in the western Atlantic except *texana* Chandler 1921, *ackleyi* Garman 1881, *ocellata* Mitchill 1815, and *cyclophora* Regan 1903. It may be distinguished from half grown and larger *texana* and *ackleyi* by the absence of thorns between the scapular region and a point slightly in advance of the axils of the pectorals, by having but one row of thorns on each side of the midrow along the tail and, on the lower surface, few if any prickles anterior to the nostrils except on end of snout and in a band along edge of disc (half grown and larger *texana* and *ackleyi* have a more or less continuous row of thorns from the nuchal region to the first dorsal, very small in size between the scapular region and about opposite the axils of the pectorals, two rows each side of the midrow along the tail, and below with the disc anterior to the nostrils more or less covered with prickles; young individuals, however, have but one side row of thorns on the tail and, below, prickles are limited to a narrow band along the edge of the disc from near tip of snout to about opposite nostrils). Its relatively smooth disc and a space between the dorsals separate it from *ocellata* all sizes of which have a thorny disc, confluent dorsals and, on half grown and larger individuals, the upper surface is marked with numerous blackish spots. While some lack ocelli others may have on each pectoral from 1 to 4 varying from round to oval. The relatively large number of thorns (34-47) along the midline of the

tail and the rather inconspicuous ocelli set apart *bahamensis* from *cyclophora* the types of which (410-480 mm long) are described as having 10-11 tail thorns.

Description of Holotype. Proportional dimensions in per cent of total length.

Disc. Extreme breadth 69.5; length¹ 54.1.

Snout length in front of. Orbits 14.8; mouth 16.7.

Orbits. Horizontal diameter 4.2; distance between 3.3.

Spiracles. Length 3.0; distance between 6.4.

Mouth. Breadth 8.0.

Exposed nostrils. Distance between inner ends 7.8.

Gill openings. Length 1st 1.6; 3rd 1.9; 5th 1.4; distance between inner ends 1st 14.6; 5th 8.0.

First dorsal fin. Height 2.4; length of base 4.0.

Second dorsal fin. Height 2.0; length of base 5.2.

Pelvic. Anterior margin 9.9.

Distance. From tip of snout to center of cloaca 51.0; from center of cloaca to 1st dorsal 34.4; to tip of tail 49.0; from rear end of 2nd dorsal to tip of tail 2.4. Interspace: 1st and 2nd dorsals 3.0.

Disc 1.3 times as broad as long, the maximum angle in front of spiracles about 90°; anterior rays of pectorals extending 57 per cent of distance from level of front of orbits toward tip of snout, the latter projecting; rostral process firm, narrow, extending nearly to tip of snout; anterior margins of disc slightly convex to about opposite mouth, thence concave to outer corners which are abruptly rounded, the width of disc across anterior edge of orbits 28.7 per cent of total length of specimen; posterior margins and corners and inner margins all rounded. Axis of greatest breadth 64 per cent of distance rearward from tip of snout to axils of pectorals. Tail with a narrow lateral fold low down on each side, originating opposite tips of pelvics, extending to tip of tail, scarcely widening rearward; length of tail from center of cloaca to origin of first dorsal 0.7 times, to origin of second dorsal about 0.9 times, and to tip almost as great as distance from center of cloaca to tip of snout.

There are no thorns on tip of snout but several very small ones over anterior part of rostral cartilage; malar thorns absent; a patch of very small thorns, in area about that of spiracular opening, outward and forward from and close to anterior margin of

¹For outlines of a typical skate illustrating terminology and methods of measurement, see Bigelow and Schroeder, 1953, figure 1.

orbit; 5-7 thorns along inner edge of orbits anteriorly, 4 posteriorly, with an additional one opposite spiracles; midline of back with 4 nuchal thorns followed by a row of 47 thorns, the first one a little in advance of axil of pectorals, extending along middle of tail to first dorsal, the thorns alternating large and small, sharp pointed, the tips directed rearward, in a straight line anteriorly but staggered posteriorly; one row of similar thorns, slightly smaller in size, low down each side of the midrow, beginning opposite axil of pelvis reaching almost to tip of tail; 5 thorns in space between dorsals; no scapular thorns; a single row of 14-15 narrow backward pointing sharp thorns along edge of disc, about equally spaced and lying horizontally, beginning opposite spiracles and extending rearward a distance a little less than that from orbits to tip of snout; alar thorns in a single row with evidence that a second row will appear, the length of row about equal to distance between outside rim of orbits. Upper surface otherwise smooth. A short row of 8 or 9 inconspicuous mucous pores on each side and close to nuchal thorns. Lower surface with prickles on end of snout and with a band of closely arranged small thorns and prickles extending along edge of disc from tip of snout to opposite first gill openings. Remainder of lower surface of disc and the tail, smooth.

Snout in front of orbits 3.5 times as long as orbit, its length in front of mouth 2.1 times as great as distance between exposed nostrils. Distance between orbits 0.8 times as great as length of orbit; orbits 1.4 times as long as spiracles. Distance between first gill openings 1.9 times the distance between exposed nostrils, between fifth gill openings the distance is equal; first gill openings slightly wider than fifth and about 20 per cent as long as breadth of mouth. Nasal curtain and expanded (outer) margin of nostrils fringed. Jaws moderately arched.

Teeth $\frac{42}{40}$, arranged in quincunx, close-set, with circular bases, those in central section with sharp triangular cusps, those toward corners of jaws with low rounded cusps.

Dorsal fins similar in shape, the base of second slightly longer than first; interspace three-fourths as long as base of first dorsal. Caudal very small, its base about half that of second dorsal with which it is confluent. Pelvis deeply concave, weakly scalloped rearward; anterior lobe about half as long as distance from its own origin to rear tip of pelvic, with 3 radial cartilages in addition to the first stout one; posterior lobe gently convex outwardly, with 19 radial cartilages, the rear tips abruptly rounded.

Claspers reaching rearward nearly two-thirds the distance from axils of pelvics toward first dorsal.

Color. Disc and tail pale grayish brown above; a round ocellus, in diameter about length of orbit, brown in the center with a pale outer rim, on each pectoral, situated a little posterior to the greatest axis of disc. Distance of ocelli from outer angle of disc about the same as from each other, which distance from center to center is 1.06 times the distance to center of orbit. Lower surface probably white in life, with no dark pores.

Our other three specimens are in close agreement in nearly all the proportional dimensions given for the holotype but their disc is wider, 72.8-73.5 per cent of total length of the specimen compared with 69.5 per cent on the holotype, and somewhat broader across the anterior edge of the orbits, 32.5-34.9 per cent compared with 28.7 per cent. The distance between the center of the ocelli times that from the ocelli to center of orbits is virtually the same as that of the holotype on two specimens (1.02-1.03 times) but on the 490 mm female it is 1.25 times. The tooth count on the female is $\frac{3}{3}\frac{6}{5}$ and on the 343 and 530 mm males $\frac{3}{3}\frac{5}{4}$ and $\frac{4}{3}\frac{0}{8}$, respectively. The larger male has an additional pair of ocelli, smaller in size, situated posteriorly slightly in advance of the axil of pectorals.

There are one or two fewer orbital thorns on each of the paratypes and the space along the central part of the inner rim of the orbit lacks thorns, as on the holotype. The smallest male has but one nuchal thorn, the other two paratypes three thorns. The mid row of tail thorns number 34, 41 and 41 and there are 3 or 4 thorns in the space between the dorsals on these three specimens.

So far known only off the Bahama Banks in depths of 200-225 fathoms (366-411 m).

RAJA BULLISI Bigelow and Schroeder 1962

All the previously known specimens of this recently described species, 8 males and 3 females 168-400 mm in total length, were taken in the vicinity of Dry Tortugas, Florida, between 24°18' and 24°36'N, in depths of 200-300 fathoms (366-549 m).

Ten more were trawled by the "Oregon" as follows: 1 at 18°37'N, 64°57'W, in 220 fathoms (400 m), station 2606 off the Virgin Islands; 1 each at 11°31'N, 62°24'W, in 185-200 fathoms (339-366 m), and 11°30'N, 62°29'W, in 180 fathoms (330 m), stations 2351 and 2772, respectively, off Venezuela; 3 at 09°04'N,

81°25'W, in 150-160 fathoms, (275-293 m), station 3597, off the north coast of Panama; 1 at 07°27'N, 54°32'W, in 110 fathoms (200 m), station 2290, 1 at 07°27'N, 54°27'W, in 120-135 fathoms (220-247m), station 2291, and 2 at 07°15'N, 53°21'W, in 135 fathoms (247 m), station 2023, off the coast of Surinam. These specimens, 5 males and 5 females, range in length from 166 to 478 mm.

The upper surface of the disc of those up to 400 mm long have 2 widely spaced thorns along the anterior margin of the orbit and 1 posterior thorn, 1 nuchal thorn, and 13 to 15 thorns along the midline of the tail beginning somewhere between the axils of the pectorals and the pelvics, ending a little before the origin of the first dorsal. Some are otherwise smooth above but others have minute prickles sparsely distributed on the disc and along the sides of the tail. The tail may have, low down, a more or less incomplete row of very small thorns that might easily be overlooked.

The lower surface is smooth on two males of 166 and 175 mm, respectively, but on all sizes upward of 195 mm, of both sexes, there are coarse prickles and small thorns along the anterior half of the rostrum and a narrow band of prickles along the margin of the disc from the tip of the snout to opposite the nostrils, in some cases as far as a point opposite the mouth. The disc below is otherwise smooth, and the tail also.

The largest specimen, a female of 478 mm, is more closely prickled over the upper surface of the disc and on the sides of the tail, with a few prickles on the pelvics, dorsals, and caudal fin, and there are 17 thorns along the midline of the tail. It has, in addition to the orbital thorn arrangement given above, a thorn at the center of the orbit's inner margin.

The known range now extends from Dry Tortugas, Florida, to the coast of Surinam, in 110-300 fathoms (200-549 m).

RAJA CLARKII Bigelow and Schroeder 1958

Figure 1

This species is characterized among western Atlantic rajids by the presence of a band of formidable and very sharp thorns extending along the margin of the lower surface from the tip of the snout almost to the outer corners of the disc. The three largest specimens we have seen, (including the type), 580-745 mm long, are marked above on the disc with one or more pairs

of prominent white roundish or barlike spots. Two of 255 and 364 mm, respectively, described in 1962 (Bigelow and Schroeder), lack the spots but otherwise agree closely with the larger specimens. The type was trawled in the northern part of the Gulf of Mexico in 260 fathoms (476 m), the other two off the coast of Nicaragua, in 275-300 fathoms (503-549 m).

The present collection includes a male of 228 mm from $14^{\circ}10'N$, $81^{\circ}55'W$, off the coast of Nicaragua, 240-250 fathoms

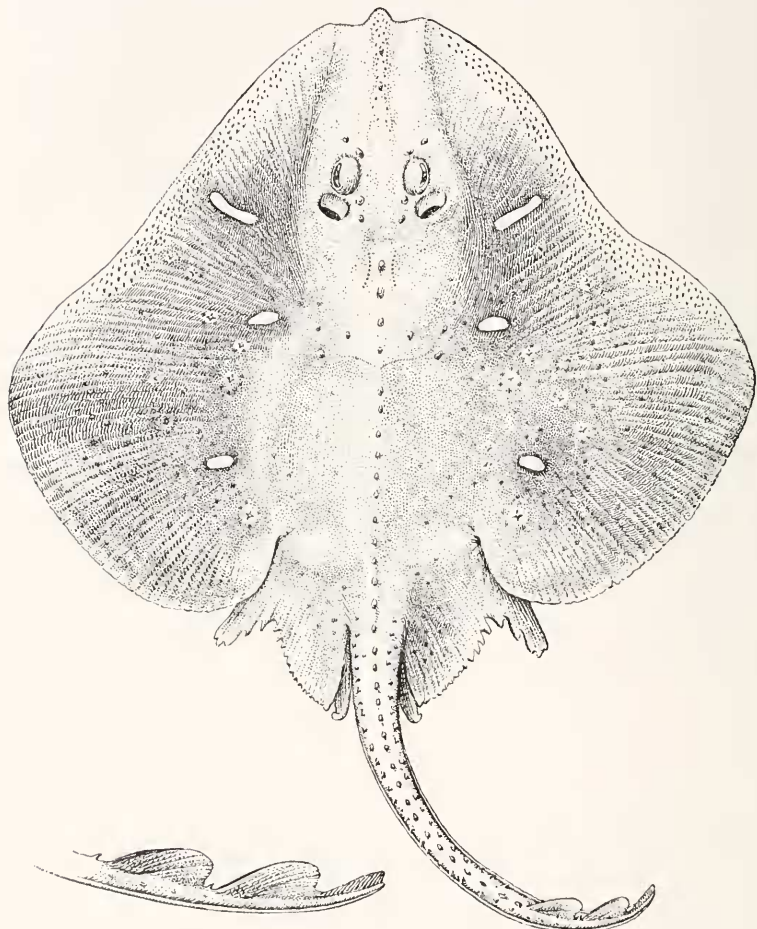


Figure 1. *Raja clarkii*, holotype, immature male 665 mm long; end of tail showing dorsal fins and caudal fin, about $\times 0.5$. (After Bigelow and Schroeder, 1958.)

(439-457 m), "Oregon" station 3565, and a female of 176 mm from 9°03'N, 81°22'W, extending the range to Panama, 200-220 fathoms (366-400 m), station 3598. These also lack the prominent white spots. But a male of 341 mm trawled in the northeastern part of the Gulf at 27°54'N, 85°09'W, in 200 fathoms (366 m), station 4086, already has three pairs of white spots, the front pair elongate, the middle pair very small and roundish, and the rear ones oval and slightly larger than the latter.

RAJA FULIGINEA Bigelow and Schroeder 1954

Known heretofore only from the type, a juvenile male 306 mm long, USNM No. 163367, from "Oregon" station 534, in the northwestern part of the Gulf of Mexico, 27°32'N, 93°02'W, in 400-450 fathoms (732-823 m).

The present collection includes the second known specimen of this skate, a female 330 mm long, from "Oregon" station 4147, about 45 miles southwest of Dry Tortugas, 24°12'N, 83°32'W, in 500 fathoms (915 m).

R. fuliginosa closely resembles *R. bathyphila* Holt and Byrne 1908, the recorded captures of which include only the 5 specimens taken by the "Albatross" in 1884 and 1886 between the offings of Chesapeake Bay and southern Nova Scotia, in 835-1188 fathoms (1525-2175 m) (Bigelow and Schroeder, 1953, p. 159), and the type trawled on the Irish Atlantic slope between 893 and 673 fathoms (1635-1230 m). *Fuliginosa* differs from *bathyphila* chiefly in its considerably more obtuse (125°-130°) anterior angle of the disc; prickles cover the entire upper surface of the disc, posterior lobes of pelvis, and the tail. Also, the tail below is prickly over most of its area. *Bathyphila* has an anterior disc angle of 90°-108°; the upper surface of the disc and the tail lack prickles in some areas, particularly the disc along its posterior margins; the pelvis have few prickles or may be naked, and the tail below is smooth except along its anterior part where the lateral bands of prickles encroach on the lower surface.

RAJA GARRICKI Bigelow and Schroeder 1958

This skate has been known from only two specimens, mature males, one of 975 mm in total length, holotype, USNM No. 156711 and one of 1019 mm, paratype, MCZ No. 39616, both from the northern part of the Gulf of Mexico, 28°32'N, 86°20'W, in 260 fathoms (476 m), "Oregon" station 1277.

We now have a female, 763 mm long, which differs from the males chiefly in the arrangement of certain of the thorns and prickles. Thus, the female has on the tail, in addition to the midrow of thorns which extends from the nuchal region to the first dorsal fin, a nearly complete side row from the axils of the pelvises to opposite the first dorsal fin and, in addition, a second side row low down originating a little posterior to the upper one. The band of prickles along the margin of the upper surface of the disc extends from the snout to the outer angle and continues to the posterior corners. On the types there is only one row (incomplete) of thorns each side of the midrow on the tail and the prickles which edge the disc above run out before reaching the outer angle.

The female was taken at $14^{\circ}10'N$, $81^{\circ}58'W$, off Nicaragua, in 150-160 fathoms (275-293 m), "Oregon" station 3566, MCZ No. 42079.

RAJA LENTIGINOSA Bigelow and Schroeder 1951

We have reported this skate as apparently widespread in the Gulf of Mexico within its known depth range of 29 to 305 fathoms (53-558 m), and as occurring off the coasts of Honduras and Nicaragua to as far south as $11^{\circ}27'N$ (Bigelow and Schroeder, 1962). It appears to be well distributed along the coast of Central America for our present collection includes 7 more specimens from off Honduras, "Oregon" stations 3623, 3625, 3626, and 6 from British Honduras, stations 3634, 3635. They range in length from 108 to 329 mm and were trawled in depths of 105 to 250 fathoms (192-457 m).

The smallest mature male we have seen, with elasper hooks exposed, is 345 mm, and the largest specimen, a female, is 435 mm in total length.

RAJA PURPURIVENTRALIS Bigelow and Schroeder 1962

Figure 2

The holotype, a female 510 mm long, the only previously known specimen, was trawled in the northern part of the Gulf of Mexico, $27^{\circ}48'N$, $88^{\circ}45'W$, in 850-1100 fathoms (1555-2010 m), "Oregon" station 2577. Additional captures are as follows: a female of 320 mm from $28^{\circ}56'N$, $88^{\circ}19'W$, in 600-750 fathoms (1095-1375 m), station 3658; also 3 males and 4 females of 150-314 mm from $7^{\circ}55'N$, $53^{\circ}55'W$, in 500 fathoms

(915 m), station 4296, and a 300 mm male from 7°46'N, 54°00'W, in 400 fathoms (732 m) off the Guianas, station 4299.

Following are certain proportions in per cent of total length of all known specimens.

Total length mm	Disc width	Disc length	Snout to center of cloaca	Center of cloaca to 1st dorsal	Center of cloaca to tip of tail	Sex
150	60.6	48.7	43.3	43.3	56.7	♂
162	61.7	48.1	42.0	42.0	58.0	♀
173	56.7	46.3	41.0	42.2	59.0	♀
225	53.8	45.4	41.3	42.2	58.7	♀
252	52.1	46.8	42.8	42.2	57.2	♂
300	52.0	48.3	43.0	41.4	57.0	♂
312	56.2	48.7	45.0	39.1	55.0	♂
314	53.8	50.3	46.2	38.5	53.8	♀
320	56.0	46.7	43.2	44.6	56.8	♀
510	53.7	49.6	46.7	41.9	53.3	♀

The maximum angle of the disc in front of spiracles ranges from 105° to 115° on the three smallest, which still show the yolksac scar, from 88° to 101° on those 225-320 mm long and 85° on the holotype. The axis of greatest breadth of the disc, rearward from the tip of snout toward axils of pectorals, falls within the narrow range of 70-75 per cent.

In armature, the upper surface of the disc, tail, and posterior lobe of the pelvis, is closely covered with small sharp prickles. The dorsals, caudal fin and the skin over eyes also have prickles. There is a single thorn at the inner anterior margin of each orbit, and another at the posterior margin, save on one specimen which has 2 small posterior thorns at one orbit. There are 1 or 2 small thorns slightly inward from the rear margin of each spiracle. A row of 35-43 thorns extends along the midline to the first dorsal fin, the first 3 from the nape to the pectoral arch being the most prominent, followed by 5-10 smaller thorns, then by larger thorns to the dorsal fin, the last 3 or 4 being somewhat smaller on several specimens, all rather evenly spaced and not alternating in size from thorn to thorn. Apparently the row of thorns on each side of the midrow on the tail, present on the holotype, develops with age for it is lacking on all the present specimens. The tooth count is 36 in the upper jaw of a specimen 175 mm long, and 38 to 42 on 5 specimens ranging from 310 to 510 mm, there being 2 to 5 less in the lower jaw except on the type which shows no variation. Most of the teeth, of both sexes,

have a very small triangular cusp. The largest male of 312 mm is immature, the claspers failing to reach the tip of the pelvics by a distance about equal to $1\frac{1}{2}$ times the diameter of the orbit.

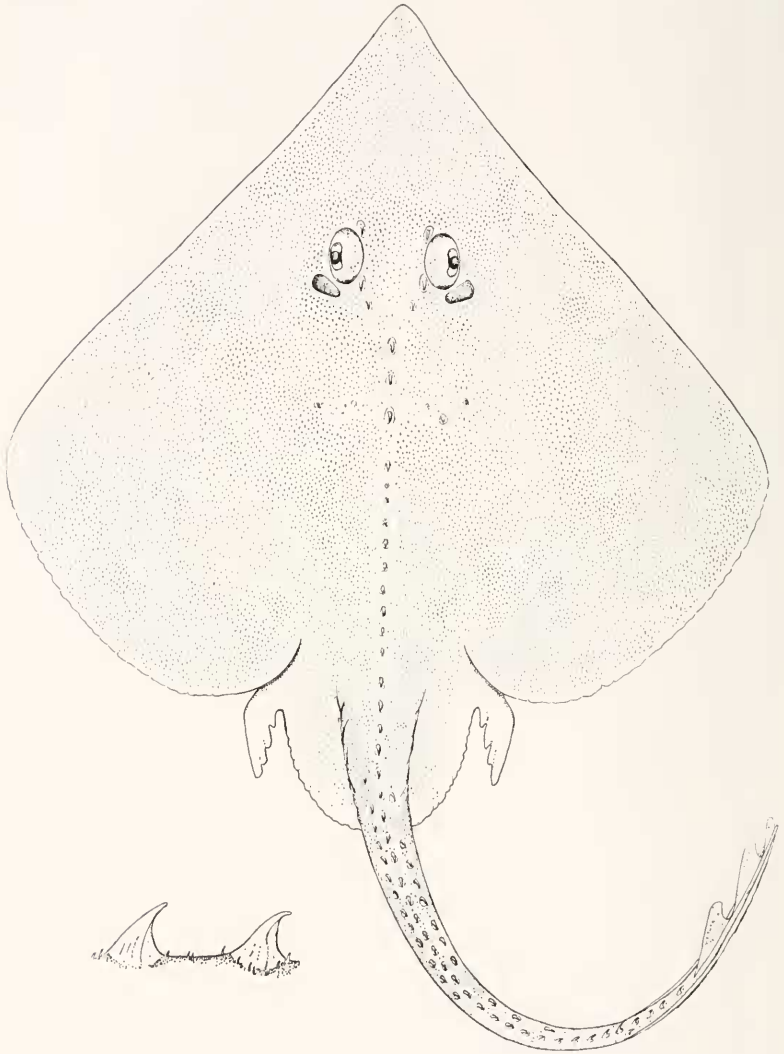


Figure 2. *Raja purpuriventralis*, holotype, female 510 mm long. Lower left, side view of thorns along the midline, about $\times 3$. (After Bigelow and Schroeder, 1962.)

The color of the upper surface in preservative is plain dark gray. The lower surface of the disc is black, dark brown or chocolate plum, the tail being of the same shade or somewhat lighter. White areas are present around the jaws, along the rostrum on some, and just below the pectoral arch on 6 specimens but lacking on 4. A 300 mm long skate has, in addition, white areas below the cloaca, on the pelvics, end of tail, and on the tip of snout which is also white above. When fresh from the water the holotype was purplish above and below.

RAJA TEEVANI Bigelow and Schroeder 1951

Figure 3

The original description of *teevani* is based on two specimens, both males, the holotype 558 mm in total length and the paratype of 302 mm, trawled at 29°11'N, 86°32'W, off Pensacola, Florida, in 305 fathoms (558 m), "Oregon" station 279. Subsequently, two females of 247 and 455 mm were taken in the same region, in 260-320 fathoms (476-585 m), stations 3688 and 3217, respectively, one of 264 mm off the northwest edge of Great Bahama Bank and another, of 340 mm in Santaren Channel, in 300-340 fathoms (549-622 m), "Silver Bay" stations 2475 and 3514. The known geographic range has now been extended still further south for the "Oregon" captured 4 males and 7 females, ranging in length from 175 to 635 mm, between 16°43 and 12°25'N, off the coasts of Honduras and Nicaragua, in 240-400 fathoms (439-732 m), stations 1888, 1919, 1921, 1924, 1944, 3561, 3565, 3571 and 3576.

The account of this species is amplified as follows. The upper surface may be sparsely prickled, chiefly anterior to the spiracles on some, over much of the disc, pelvics and sides of tail on others, but prickles usually are lacking on young individuals. The thorns on the tail, in a single row, range in number from 11 to 20 on our specimens up to 577 mm in length.

The largest, a nearly mature male of 635 mm, has about 30 tail thorns, alternating in size, and it is apparent that the smaller thorns developed between the larger as the row begins at about the axil of the pelvics and ends at the first dorsal as it does on all the smaller sizes. There are coarse prickles on the rostrum and along the margin of the disc from opposite the orbits to opposite the scapular arch. The exposed alar thorns are in 2 to 3 rows and the claspers extend nearly two-fifths the distance from the axil of the pelvics toward the tip of the tail.

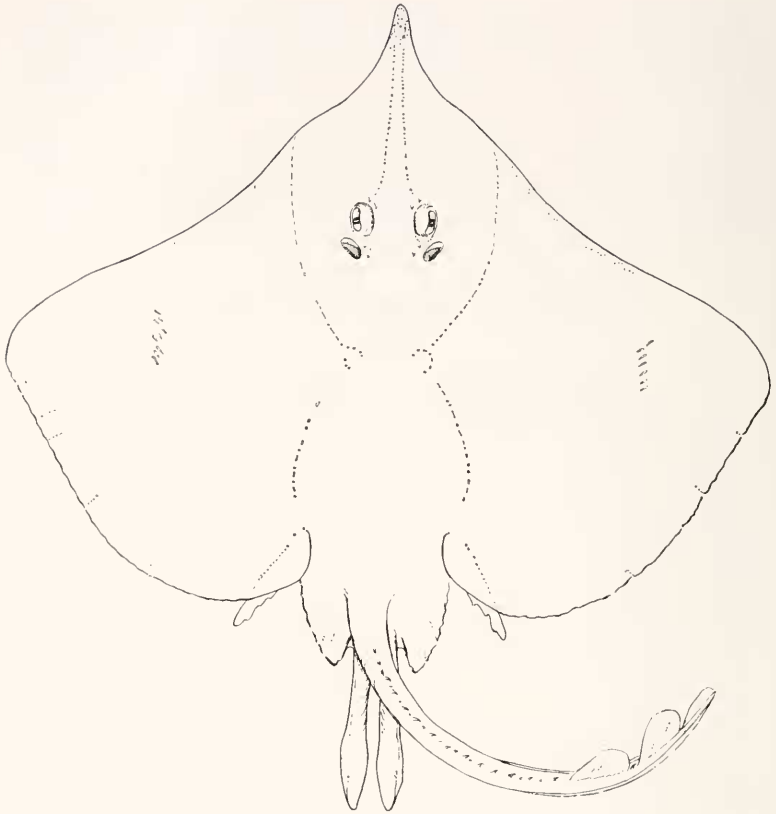


Figure 3. *Raja teevani*, nearly mature male, 635 mm long. Drawing by Jessie Sawyer.

The dorsals are virtually confluent on the types but all the other specimens have a short interdorsal space of from $\frac{1}{14}$ to $\frac{1}{4}$ the length of the first dorsal base. There are 26 to 36 series of teeth in the upper jaw and about the same in the lower. The marginal dusky band on the lower surface may extend from the outer angle of the disc rearward and on to the pelvics, or forward toward the tip of the snout, or be scarcely evident. Also, below, individuals may be pale brownish, mottled brown, or whitish, the pelvics and the tail sometimes darker. A few dark-edged pores are present, most noticeably anterior to the mouth within the translucent areas beside the rostrum.

RAJA TEXANA Chandler 1921

This skate, formerly known only from within the Gulf of Mexico, has recently been taken on the southeastern coast of Florida. We are obliged to Dr. C. Richard Robins and the University of Miami Marine Laboratory for the opportunity of examining a small collection of *texana* which includes several juvenile specimens collected in Biscayne Bay in 1958 and 1959. Also, the "Silver Bay" trawled two specimens of 150-225 mm on the eastern side of the Florida Keys in the Straits of Florida, 24°43'N, 80°43'W, in 48 fathoms (88 m), station 2383.

We have stated (Bigelow and Schroeder 1953, p. 281) that "*R. texana* is closely allied to *R. ackleyi*, but it appears to be distinguishable from the latter by its relatively wider disc with abruptly rounded corners (broadly rounded on *R. ackleyi*), by its color, the upper surface of its disc lacking the small light and dark spots that mark *R. ackleyi*, and by the shape of the ocellar spots, which are round in *R. texana* but oval in *R. ackleyi*." And in the same publication (p. 155, footnote 67), we report, "In *R. ackleyi* the distance from the center of the ocellus to the center of the orbit is about 1.0-1.3 times the distance between the centers of the ocelli; in four specimens of *R. texana* this distance was 0.83-1.0 times." These statements must now be modified, based on additional specimens of *texana* and of one more *ackleyi*.

The width of the disc proves to be of but limited value as a character in recognizing *texana* from *ackleyi*. Thus, *texana* has been found to have a disc width 58.4-70.0 per cent of the total length of the specimen, while on the holotype of *ackleyi*, a male of 410 mm, this proportion is only 53.7 per cent; on two females it is 61.4 and 63.0 per cent, respectively.

The shape of the outer corners of the disc and the color of the upper surface are as previously described for the two species but, while the ocellar spots are round on most of the *texana* seen, on a few the outline is ragged, and on one of our *ackleyi* they are roundish rather than oval. Perhaps the character that might prove most useful for distinguishing the two species, in combination with the other small differences, is that on *texana* (24 specimens) the distance, center to center, from ocellus to orbit is 0.77-1.00 times (average 0.87) the distance, center to center, between the ocelli, while on the 3 known *ackleyi* this distance is 1.00, 1.07 and 1.30 times, respectively. Also, *texana* has no thorn or thorns on each shoulder whereas one or more small ones are present on *ackleyi*.

Texana has now been recorded from depths of less than 8 fathoms (15 m) down to 60 fathoms (110 m). In the Gulf of Mexico the "Oregon" trawled it at 68 stations from May 1950 to September 1955 (Springer and Bullis, 1956).

BREVIRAJA ATRIPINNA Bigelow and Schroeder 1950

Four specimens of this species, 2 males 275-293 mm in total length and 2 females of 244-287 mm, were taken at "Silver Bay" station 2458, 23°40'N, 79°15'W, in Santaren Channel, Bahamas, at a depth of 290 fathoms (530 m).

The 293 mm male is the first mature specimen we have seen. The claspers are narrow, firm, and extend $\frac{1}{3}$ the distance from the axil of pelvics to the first dorsal fin. There are 3-5 rows of very small alar thorns on the outer part of the pectorals, the longest row about $1\frac{1}{2}$ times the diameter of orbit. The teeth have narrow sharp cusps in the central sector of the jaws and wide triangular cusps toward the outer corners. The 275 mm male is still immature, the claspers flexible and extending only $\frac{1}{5}$ the distance to the first dorsal: the alars have not yet appeared, and all the teeth have low triangular cusps.

The known range of *atripinna* extends from the north coast of Cuba to the offing of Cape Fear, North Carolina, 33°51'N, 76°18'W, within depths of 225 to 500 fathoms (410 to 915 m).

BREVIRAJA ISHIYAMAI Bigelow and Schroeder 1962

Figure 4

One specimen was trawled off Palm beach, Florida, 26°39'N, 79°30'W, in 400 fathoms (732 m), "Silver Bay" station 2484, 6 in the Straits of Florida, 24°24'N, 80°00'W, 400-470 fathoms (732-860 m), station 3516, and 2 to the southwestward of Dry Tortugas, Florida, 24°12'N, 83°32'W, in 500 fathoms (915 m), "Oregon" station 4147. These range in length from 120 to 358 mm, all females.

Previous records include a female from off Cape Canaveral, Florida, 1 from southwestward of Dry Tortugas, and 2 from the coast of Nicaragua (one of these the only male seen), in depths of 275-520 fathoms (503-950 m).

Its lack of a space between the dorsals or a very short one (the widest about $\frac{1}{3}$ the base of the first dorsal fin on the 13 known specimens) and absence of prickles on the lower surface of tail easily separate it from *atripinna* which it most closely

resembles but which has an interdorsal space at least as great as the first dorsal base and a tail covered with prickles on its lower surface. All our specimens have a short space between the second dorsal fin and the origin of caudal except one where these fins are confluent.

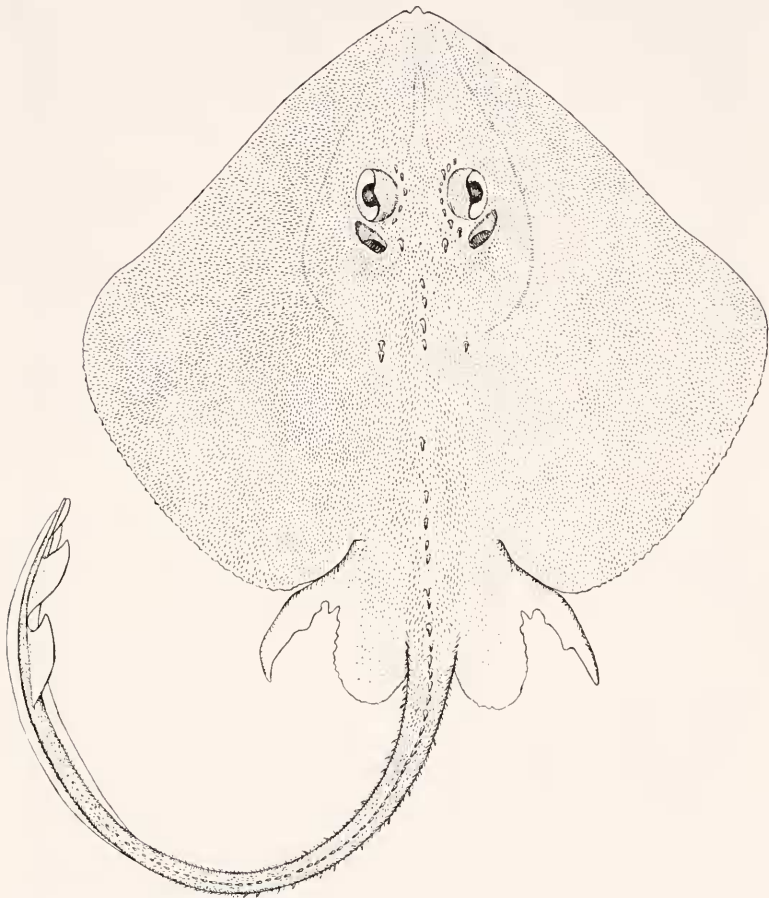


Figure 4. *Breviraja ishiyamai*, holotype, female 338 mm long. (After Bigelow and Schroeder, 1962.)

BREVIRAJA SINUSMEXICANUS Bigelow and Schroeder 1950

Our most recent collection of this species comprises 141 specimens, 77 males and 64 females, ranging in length from 97 to 360 mm, trawled at 16 "Oregon" stations, in 200-500 fathoms (366-915 m), most of them taken within an area some 40 to 70 miles to the eastward of the Mississippi Delta.

The thorniness of this species is conspicuous even on the smallest specimens for two, only 97 and 102 mm long, respectively, with a disc 45 mm wide, have the upper surface of the disc and tail covered with spines and prickles.

The ground color is pale brown, the disc peppered with minute spots of darker brown or brownish purple, some with blotches still darker, while the tail on those up to about 250 mm long has about 10-12 dark cross bars, most prominent on the young. An occasional specimen has a very small light spot on each side opposite the pectoral arch about halfway between the midline and outer edge of the disc.

Known from the northern part of the Gulf of Mexico and from 1 station in the southwest in the Gulf of Campeche, 19°37'N, 92°40'W, within a depth range of 170-500 fathoms (310-915 m).

CRURIRAJA ATLANTIS Bigelow and Schroeder 1948

This rajid, separable from its genus mates by a wider space between the dorsals, has been known only from the north central coast of Cuba where "Atlantis" trawled 13 specimens 100-332 mm long, in depths of 280-425 fathoms (512-777 m), during cruises made in 1938 and 1939. Our present collection includes 23 specimens, 13 males and 10 females, 100-340 mm long, taken off Cape Canaveral and in the Straits of Florida south of Miami, "Silver Bay" stations 442, 3516; in Santaren Channel east of Cay Sal Bank, stations 2458, 2469, 3514; and off the northwest edge of Great Bahama Bank, station 2475, ranging from 23°30' to 27°53'N, and 79°09' to 80°00'W, in 290 to 470 fathoms (530 to 860 m).

Six males 247-330 mm long have a disc width ranging from 52.8 to 57.3 per cent of total length of specimen, distance from tip of snout to center of cloaca 37.3-38.0, space between dorsals 8.1-10.5 and distance from rear end of second dorsal to tip of tail 3.3-4.9. On five females 261-336 mm long these proportions are 51.7-57.2, 35.3-39.1, 8.1-9.6 and 3.9-4.7, respectively. All these proportions are in close agreement with previous accounts

of this species as are the arrangements of spines and prickles. However, while the pelvics have been described as being smooth, and a re-examination of the types prove this to be the case, one of our females, 317 mm long, has a patch of prickles on the pelvics while another of 305 mm has a scattered few. The alar thorns have not yet appeared on an immature male of 247 mm, are in 2-3 short rows on one of 280 mm, 3-4 rows at 295 mm, and 6-7 rows at 300-330 mm, the latter specimens having the longest rows about equal in length to the distance from tip of snout to orbit. The claspers of the 247 mm male do not reach the tip of the pelvics while on 5 nearly mature and mature specimens of 280-330 mm they reach about two-fifths the distance from the axil of pelvics to the origin of the first dorsal.

All these specimens are plain pale brown above with dusky dorsals and caudal. The lower surface of the smallest male is whitish except the limb-like anterior segment of the pelvics which is brown. The other specimens are variously blotched with brown on the abdomen and posterior part of the pectorals; on some the pelvics (including the claspers) are more or less brownish, on others white, while the tail is dusky at the tip.

CRURIRAJA POEYI Bigelow and Schroeder 1948

This species has heretofore been recorded from a number of trawling stations made off the south central and north central coasts of Cuba, in the Bahamas, and at one station off St. Augustine, Florida, within a depth range of 210-475 fathoms (385-870 m).

Recent captures include 25 specimens 84-337 mm in total length from the Bahamas, in 200-300 fathoms (366-549 m) "Silver Bay" stations 2457, 2458, 2469, 2472, 3514, and 2 specimens of 175-260 mm from the offing of Palm Beach, Florida, in 400 fathoms (732 m), station 2484.

The smallest four specimens 84, 96, 100 and 103 mm in total length, respectively, have the following arrangement of thorns and prickles: there are 5 thorns on the rostrum, 1 at the tip followed by 2 pairs; 4 thorns around the inner margin of each orbit and 2, 1, or no thorn inward from each spiracle; malar thorns in the region between the orbits and outer margins of disc are present on the 84 mm specimen, 5 thorns on one side, 10 on the other, 2 or 3 on each side of the 96 mm, both females, while the 100 and 103 mm ones, a male and a female, have none. A midrow of 31-39 thorns begins in the nuchal-scapular region and

continues in a straight line to the first dorsal fin with 1 thorn in the space between dorsals; 1 or 2 scapular thorns on each side. A band of prickles extends along the midzone of disc, beginning about midway between the scapular and pelvic arches and running out between axil of pectorals and tip of pelvis. A side row of thorns, low down on the tail, extends from about the tip of pelvis to opposite the first or second dorsal. The disc above is otherwise smooth, including the dorsals and skin over eyes. Smooth below.

Two specimens, both males, 147-156 mm long, have 7-10 rostral thorns, 6-7 orbitals and 1-2 opposite each spiracle, 5 to 12 malars on each side, a midrow of 44-52 thorns from the nuchal region to the first dorsal, the last few staggered near dorsal on the 147 mm specimen and staggered rearward from the tips of pelvises on the 156 mm one, thus approaching the arrangement on grown individuals. There are 2 thorns between the dorsals, and a second side row of thorns is developing on the tail. By the time a length of about 200 mm is attained the thorns in the midrow, from the nuchal region to a point about half way between the scapular and pelvic arches, have been shed. (For the thorn arrangement on grown individuals see Bigelow and Schroeder, 1953, p. 321 and fig. 75.)

Young specimens up to a little more than 100 mm in length are pale brown, conspicuously marked with roundish dark brown spots about half as large to as large as the orbit, rather evenly spaced over disc, with one to several bars on tail and the dorsals faintly blotched. At about 150 mm the spots are less intense but the dorsals and caudal are intense black and the lower surface is faintly mottled with pale brown, or much the same as on adults.

CRURIRAJA RUGOSA Bigelow and Schroeder 1958

The most recent account of this species (Bigelow and Schroeder, 1962) includes 39 specimens, 90-465 mm in total length, taken at 19 "Oregon" stations off the Atlantic coasts of Nicaragua and Honduras between 12°50' and 16°46'N, in 200-350 fathoms (366-640 m). It was previously known only from the holotype, trawled in the northern part of the Gulf of Mexico, "Oregon" station number lacking.

Our present collection¹ of this species includes 63 specimens,

¹ "Oregon" stations 3552, 3560, 3565, 3571, 3573, 3575, 3576, 3586, 3600, 3616, 3628, 3635, 3653, and "Silver Bay" station 3516.

90-485 mm long, of which 3 are from the north coast of Panama, 38 from off Nicaragua and Honduras, 12 from off British Honduras, 1 from the south coast of Jamaica and 7 from the Straits of Florida, ranging in north latitudes from $9^{\circ}03'$ to $24^{\circ}24'$ and in depth from 240 to 500 fathoms (439-915 m). Also, 2 were trawled in the northern part of the Gulf of Mexico, $29^{\circ}12'N$, $87^{\circ}52'W$, in 280-300 fathoms (512-549 m). Of these, 5 males 314-485 mm long and 3 females of 305-442 mm, selected at random, have the following proportions in per cent of total length, there being no significant difference in proportions between the sexes.

Disc. Extreme width 53.2-66.0; length 39.0-44.4.

Orbits. Horizontal diameter 4.3-4.6; distance between 2.9-3.1.

First dorsal fin. Height 2.5-2.9; length of base 3.8-4.9.

Second dorsal fin. Height 2.5-3.6; length of base 3.8-4.6.

Interspace. 1st and 2nd dorsals 0.7-2.3.

Pelvics. Length of anterior limb 13.6-15.0.

Distance. From tip of snout to center of cloaca 39.0-44.7; axis of disc across anterior margin of orbits 19.3-25.5.

These percentages fall in line with those given previously. Also, the tooth counts (38-44 series in the upper jaw on the 4 specimens examined) and arrangement of prickles and spines are in agreement.

The specimen taken at greatest depth, in 470-500 fathoms (860-915 m), "Oregon" station 3586, is dark brown both above and below instead of the usual pale brown above and whitish, sometimes with a few brown mottlings, below. It has only 28 thorns in the midrow, although in addition there are scars in spaces where thorns are missing, and the row of thorns low down along each side of the tail is lacking, a condition that has been found on an occasional specimen but usually these side thorns (smaller in size than those in the midrow) are in a complete or an incomplete row.

DACTYLOBATUS ARMATUS Bean and Weed 1909

Figure 5

This bizarre species has been known from only two specimens 264-278 mm long, one of which Bean and Weed had reported from $32^{\circ}36'N$, $77^{\circ}29'W$, in 258 fathoms (472 m) and the other from $31^{\circ}N$, $80^{\circ}W$, in about 270 fathoms (495 m). However, this latter position, which appears to be an approximate one, places the depth close to the 50 fathom (92 m) curve and we are inclined to believe that the longitude actually was closer to $79^{\circ}30'$

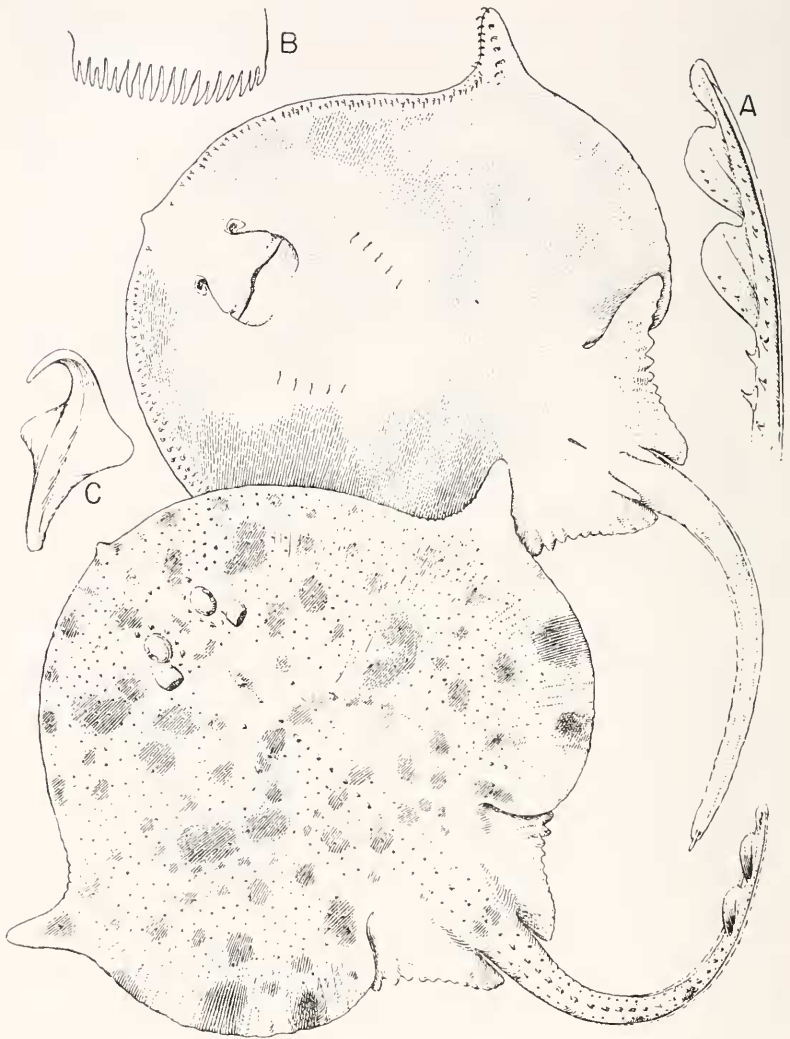


Figure 5. *Dactylobatus armatus*, male 278 mm long. *A*, Side view of posterior part of tail, about $\times 0.7$. *B*, Margin of left-hand nasal curtain, about $\times 4$. *C*, Hooked thorn from lower surface of outer corner of pectoral fin, about $\times 7$. (After Bigelow and Schroeder, 1953.)

than to 80° which would place the capture within close range of the 270 fathoms (495 m) stated by the authors. We had given these localities as from the offing of South Carolina (Bigelow and Schroeder, 1953, p. 323), and while this is so for the northern one the southern is directly off the coast of Georgia.

Our present collection adds two more specimens, a female of 316 mm from off Cape Canaveral, Florida, 28°23'N, 79°49'W, in 185-190 fathoms (338-348 m), "Silver Bay" station 3095, and a female of 250 mm from off St. Augustine, Florida, 29°42'N, 80°10'W, likewise in 185-190 fathoms (338-348 m), station 3726. Both specimens agree closely with previously published descriptions of the species.

Family PSEUDORAJIDAE

PSEUDORAJA ATLANTICA Bigelow and Schroeder 1962

Figure 6

The original account of this species is based on 105 specimens 170-481 mm long taken between the offing of the Amazon River and coast of Nicaragua, 1°45'-13°20'N, in 135-350 fathoms (247-640 m) at 22 "Oregon" stations. Apparently it is relatively abundant within its known range for our present collection includes 86 more, 86-460 mm long, from the north coast of Panama to Nicaragua, 9°00'-14°23'N, in 200-330 fathoms (366-604 m), trawled at 12 "Oregon" stations.

The yolk sac is but partly absorbed on the smallest specimen, 86 mm in total length. A female of 100 mm has left but a trace of the yolk, its disc is 53 mm wide, distance from snout to center of cloaca 32 mm, upper surface covered with prickles and below there are a few prickles in front of the mouth and on the tail. The peculiar knoblike malar thorns which have been described and illustrated for mature and nearly mature males of this species (Bigelow and Schroeder, 1962, p. 214 and fig. 13) prove to be a variable character, for on some of the large males in the present collection these thorns are sharp, as is usual among rajids.

PSEUDORAJA FISCHERI Bigelow and Schroeder 1954

This species, on which a new family and genus was based, has been known from only 5 specimens, three females and a male 262-479 mm long, taken in the southern part of the Gulf of

Mexico (type locality) in 225 fathoms (412 m), "Oregon" station 726, and a female of 270 mm from within or near the Straits of Florida, station number lacking (Bigelow and Schroeder, 1962, p. 216).

One specimen, a female 383 mm long, is in the present collection, MCZ No. 41851, trawled at 16°35'N, 80°10'W, in 315 fathoms (576 m), "Oregon" station 3560, east of Rosalind Bank off the coast of Honduras. It agrees closely with our original account.

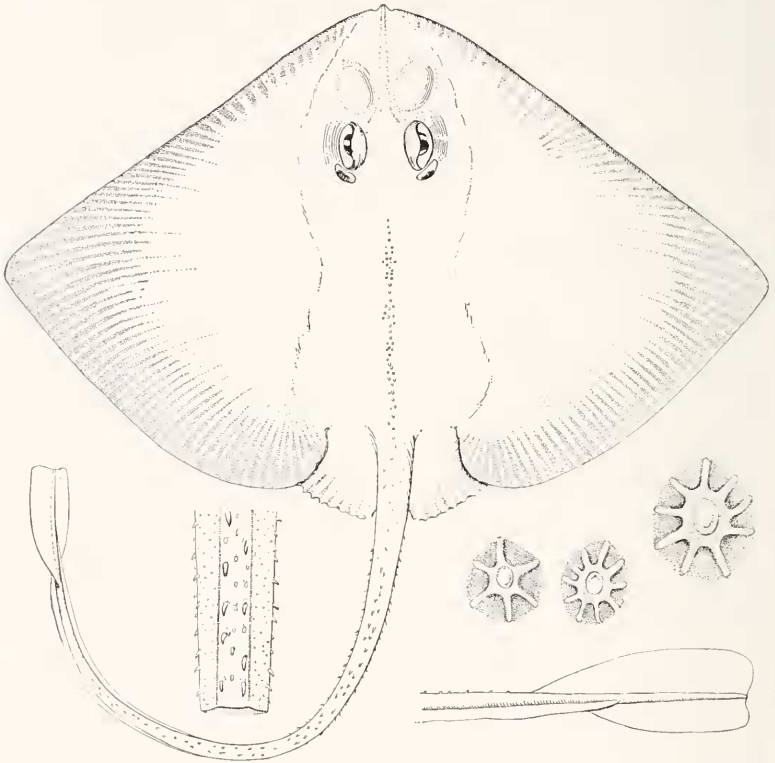


Figure 6. *Pseudoraja atlantica*, holotype, female 450 mm long; section of tail about x 1.8; thorns from along middle of disc, about x 12; caudal fin and ending of tail fold, about x 1. (After Bigelow and Schroeder, 1962.)

Family ANACANTHOBATIDAE

ANACANTHOBATIS AMERICANUS Bigelow and Schroeder 1962

Figure 7

A total of 21 specimens 95-350 mm long had previously been trawled at 4 "Oregon" stations off British Guiana, 3 off Venezuela and 1 off Honduras, 7°34' to 16°35'N, in 100-400 fathoms

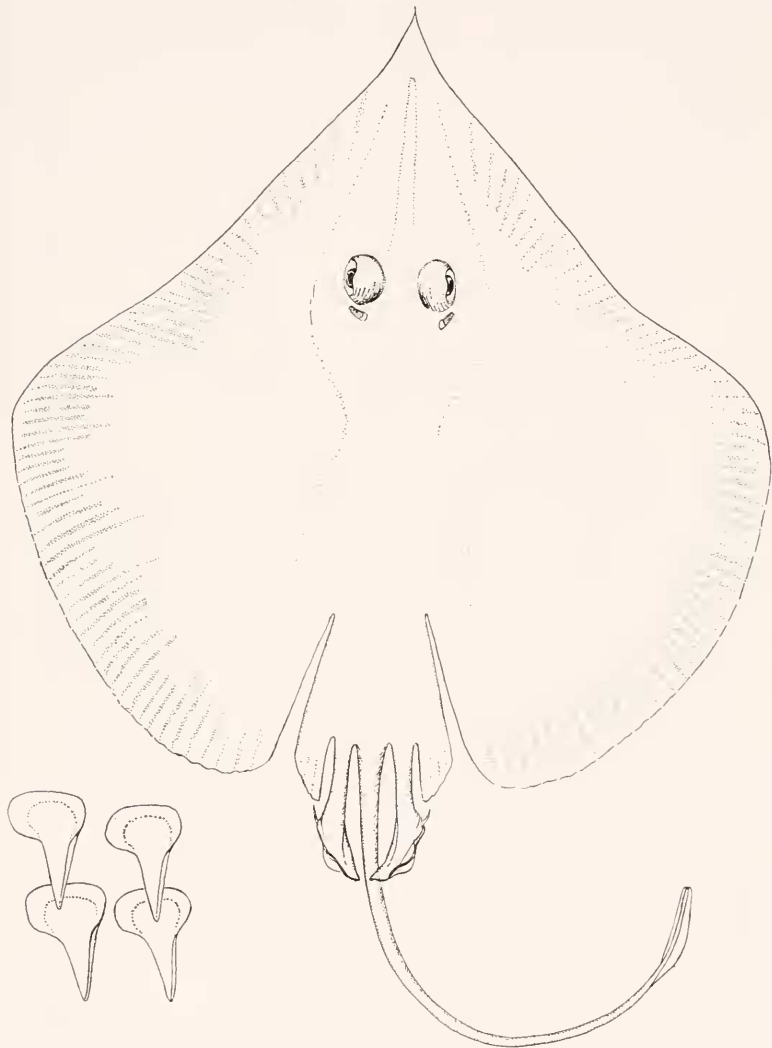


Figure 7. *Anacanthobatis americanus*, mature male 327 mm long; teeth from upper jaw, about $\times 10$. (After Bigelow and Schroeder, 1962.)

(183-732 m). Our present collection includes 31 specimens, 17 males and 14 females, 175-345 mm long, from "Oregon" stations 3582, 3599, 3600, 3601, all off the north coast of Panama 9°00' to 9°15'N, in 250-400 fathoms (457-732 m).

The color of the upper surface of the disc varies from grayish to brown, the filament at tip of snout being a little darker than the ground color on specimens larger than about 225 mm but about the same color on smaller. Below, most specimens have some white anterior to the gill openings and a white patch just below the scapular arch, the rest of disc being mottled or solid brownish. The anterior lobe of the pelvis is mottled brown and white, and the claspers of mature males, brown. The tail is brownish above and below except at and near the tip which is conspicuously white with a few brownish mottlings.

In our original account the alar thorns of the mature male are described (1962, p. 222) but they were inadvertently omitted on the illustration (p. 220, fig. 15) which is included here as Figure 7.

ANACANTHOBATIS LONGIROSTRIS Bigelow and Schroeder 1962

Figure 8

An immature male 483 mm in total length to base of terminal filament, MCZ No. 41836, was trawled in Santaren Channel, west of Great Bahama Bank, 23°40'N, 79°18'W, in 290 fathoms (530 m), "Silver Bay" station 2458. This species has been known only from the holotype, a female 507 mm long, recorded as probably from the northern part of the Gulf of Mexico, and from a very young male 135 mm long from Santaren Channel, 23°59'N, 79°43'W, in 350 fathoms (640 m), "Combat" station 450. Following are proportional dimensions in per cent of total length of the 483 mm male.

Disc. Extreme breadth 63.2; length 66.3.

Snout length. In front of orbits 26.3; in front of mouth 28.5.

Orbits. Horizontal diameter 3.5; distance between 3.5.

Spiracles. Length 1.3; distance between 6.4.

Mouth. Breadth 4.9.

Exposed nostrils. Distance between inner ends 5.0.

Gill openings. Length, 1st 1.0; 3rd 1.0; 5th 0.8; distance between inner ends, 1st 10.7; 5th 7.4.

Caudal fin. Length of base, upper 3.5; lower 1.4.

Pelvis. Length of anterior limb 14.5; distance, origin of anterior limb to tip of posterior lobe 13.5.

Distance. From tip of snout (from base of filament) to center of cloaca 59.2; from center of cloaca to tip of tail 40.8.

Disc 0.95 times as broad as long; maximum angle in front of spiracles 72° ; axis of greatest breadth 63 per cent of distance

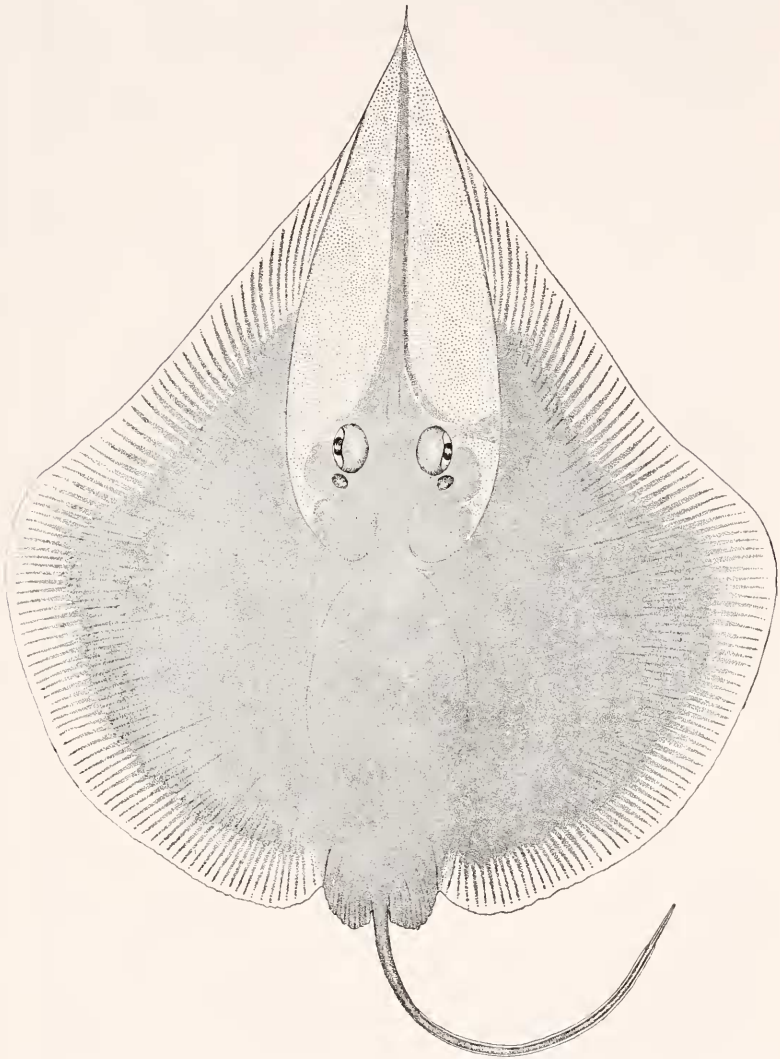


Figure 8. *Anacanthobatis longirostris*, holotype, female 507 mm long. (After Bigelow and Schroeder, 1962.)

rearward from tip of snout (exclusive of filament) to axils of pectorals; length of tail from center of cloaca 0.69 times distance from center of cloaca to tip of snout.

Snout in front of orbits 7.5 times as long, to base of rostral filament, as distance between orbits; its length in front of mouth 5.5 times as great as between exposed nostrils. Orbits as long as distance between orbits and 2.8 times as long as spiracles. Mouth very slightly arched. Teeth $\frac{28}{24}$ and, as on the holotype, they have an ovate base, are arranged in quincunx, with a nearly flat crown but with a small triangular cusp on posterior edge directed toward throat.

Pectoral rays extending forward to within 30 mm of the base of terminal filament. Pelvics with anterior leglike subdivision slightly longer (when pulled back) than the distance from its own origin to rear tip of pelvic, with two radial cartilages; posterior lobe of pelvic with abruptly rounded tip, reaching slightly beyond rear limit of disc; outer margin adnate to pectorals for about $\frac{2}{3}$ its length, inner margin joined about $\frac{3}{4}$ its length to side of tail. Claspers very small and flexible, not reaching tip of pelvics.

Color olivaceous above, probably caused by the preservative, the holotype being light purplish; terminal filament black. Lower surface a lighter shade of that above, end of snout black, and a narrow faint dusky band extends along edge of disc to about opposite mouth.

This specimen differs but little from the holotype, the widest divergence being in its broader disc and shorter snout which are 63.2 and 26.3 per cent of total length, respectively, compared with 56.8 and 29.8 per cent on the holotype.

SPRINGERIA FOLIROSTRIS Bigelow and Schroeder 1951

Figure 9

In an early account of this species (1951a, p. 110) we state that, "In 1924 von Bonde and Swart proposed a new genus *Anacanthobatis* for *Lciobatis marmoratus* von Bonde and Swart, a curious batoid from the Natal coast; skate-like in that its pelvic fins are so deeply concave outwardly that they are entirely subdivided with the anterior subdivision limblike, but differing from all typical skates in their perfectly naked skins and in lacking dorsal fins. A second new species, *dubia*, agreeing with *marmoratus* in naked skin and in filamentous prolongation of the

snout, but differing from it in that the outer margins of the posterior subdivision of its pelvic fins are fused along their anterior one-half with the inner margins of the pectorals, was also referred to *Anacanthobatis* by von Bonde and Swart. But the unique specimen seems to have lost most of its tail, so that the presence or absence of dorsal fins remains to be learned. . . .

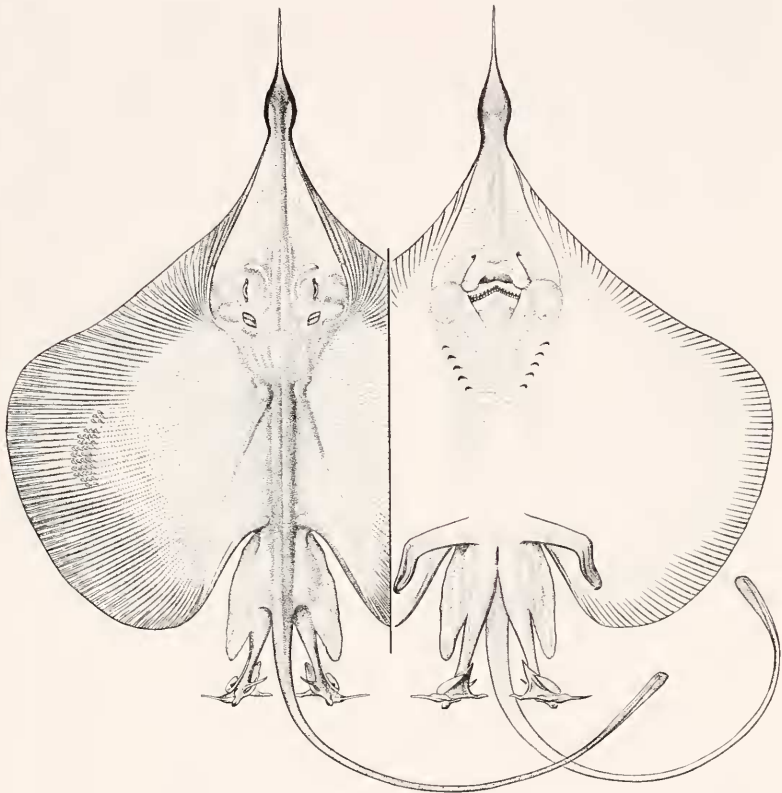


Figure 9. *Springeria folirostris*, mature male 576 mm long. Drawing by N. W. Strekalovsky.

“No batoid resembling *Anacanthobatis* was seen again until the autumn of 1950, when trawlings by the U.S. Fish and Wildlife Service vessel *Oregon* in the northern side of the Gulf of Mexico, off the Mississippi, yielded two specimens that agree with the South African *A. marmoratus* von Bonde and Swart

in structure of pelvics, wholly naked skin, and long slender tail without dorsal fins, but with *A. dubia* von Bonde and Swart in the fact that the outer margins of the posterior subdivision of the pelvic fin is fused along the anterior two-thirds with the inner margin of the pectorals, which is not the case with *marmoratus*. But the Gulf of Mexico form differs from both *marmoratus* and *dubia* in that the end of the snout is expanded in leaflike form."

The marginal fusion of the pelvic fins with the pectorals, an unusual character in the Rajoidea, seemed to us to justify a new genus, *Springeria*, set off from *Anacanthobatis* chiefly because, up to that time (1951) on the few known specimens of the latter, the outer margins of the posterior lobes of the pelvics were not united to the inner margins of the pectorals, and also by the peculiar leaflike expansion of the snout. Subsequently, however (1962), in describing *Anacanthobatis americanus* we had enough material to prove that, while the outer margin of the pelvics is fused along part of its length to the inner margin of the pectorals on females small to large and on immature males, it is entirely free from the pectorals on mature males.

We now have a mature male *Springeria folirostris* (Fig. 9), 576 mm in total length ("Oregon" station 3677), on which the pectorals and pelvics are free, as on mature males of *A. americanus*, hence it is probable that this condition obtains for all anacanthobatids when the males reach maturity. On this specimen the alar thorns are slender and sharp, pointing diagonally inward and rearward, arranged in nearly straight lines, in 5 rows, the greatest width and length of the patch being 14 mm and 40 mm, respectively, on the left side and 14 mm and 34 mm on the right. The jaws are rather strongly arched. Teeth $\frac{25}{24}$, the uppers with a narrow triangular cusp in the central series, most of them blunted, the cusps becoming low broadly triangular in the outer series; the lowers are similar except those near the corners of the mouth have an obscure cutting edge but no cusp. The claspers extend beyond the tips of the pelvics a distance about equal to that between the 4th pair of gill openings, the hooks very sharp, the distance between the tips of the longest pair, which are in a horizontal plane, being 38 mm.

Folirostris was recorded from 24 "Oregon" stations during the years 1950-1955 (Bigelow and Schroeder, 1953; Springer and Bullis, 1956) and our present collection adds a total of 11 specimens from "Oregon" stations 3677, 3682, 3683, 3686, 3688,

3714 and 3724. All the captures have been made in the northern half of the Gulf of Mexico, the range in latitude being from $26^{\circ}46'$ to $29^{\circ}30'N$, in longitude from $85^{\circ}09'$ to $96^{\circ}20'W$, and in depth from 164 to 280 fathoms (300-512 m). Of the 24 specimens we have seen, the largest male is 576 mm in total length to base of the terminal filament and the largest female 620 mm. The claspers on the next largest male, of 427 mm, do not reach the tips of the pelvics, these being still fused with the pectorals.

The tooth count appears to vary but slightly there being 25 to 28 series in the upper jaw and 1 or 2 less in the lower, on 8 males 182-427 mm long and 3 females of 340-440 mm. The teeth of the 182 mm male lack cusps while those of the 427 mm male and the 3 females have a very low triangular cusp except toward the corners of the mouth where they have an obscure cutting edge.

The color above is ash gray or light brown except for the unpigmented translucent spaces between the rostral ridge and the anterior rays of the pectorals; some have one or more sooty blotches, haphazardly located, while others are plain; the terminal expansion of the snout is narrowly and irregularly margined with black both above and below. The lower surface is whitish on the disc centrally, sometimes with a few small grayish patches, the outer belt of the pectorals usually with a grayish band extending from somewhere in advance of the outer angles to the rear margin of the disc; the tail is variously whitish and grayish, generally with a blotch opposite the tips of the pelvics.

Suborder MYLIOBATOIDEA

Family DASYATIDAE

DASYATIS VIOLACEA (Bonaparte) 1832

The first known captures in the western Atlantic of this pelagic ray were of a female with a disc width of 800 mm, taken on a tuna long-line by the U. S. Fish and Wildlife vessel "Delaware" south-southeast of Nantucket Island, $38^{\circ}35'N$, $68^{\circ}14'W$, and another (lost overboard) in the offing of Chesapeake Bay, $36^{\circ}46'N$, $70^{\circ}00'W$, about 300 miles from the coast (Bigelow and Schroeder, 1962, pp. 230-234).

A third one, a female with a disc width of 675 mm and a total length of 1465 mm, weighing 18 pounds (8.2 kg), was long-lined by the "Delaware" in the North Atlantic on April 29, 1963 at $39^{\circ}40'N$, $44^{\circ}50'W$, about midway between the United States

and Portugal, and a fourth, also a female, with a disc width of 767 mm and total length of 1513 mm, weighing $22\frac{1}{4}$ pounds (10.1 kg), was taken by the "Delaware" at $39^{\circ}07'N$, $66^{\circ}30'W$, about 90 miles (140 km) southeast of the southwestern slope of Georges Bank.

Most of the species of the suborder Myliobatoidea (except those in the family Mobulidae) have the free posterior edge of the nasal curtain fringed or with lobelets and with a median notch or gap. Some individuals of the same species may have fringes or lobelets while others lack them, and the notch or gap may be present or absent, as on *Gymnura* and as we have found on *Dasyatis violacca*.

Our 800 mm specimen has a smooth nasal curtain with no notch or gap; the 767 mm one has a curtain with a rough edge and no notch or gap, while on the 675 mm ray the curtain has a ragged edge and the notch is present.

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